Remarks

Claims 1-12 are pending in the application. Claims 1-12 are rejected. Claims 1 and 5 are objected to. Claims 1 and 5 are amended. Claim 12 is canceled. The specification is objected to. The drawings are objected to. The specification is amended. All rejections and objections are respectfully traversed.

The specification is amended to add reference characters from the drawings which were previously missing due to a clerical error. In addition, the specification is amended to correct informalities pointed out by the Examiner. No new subject matter is added.

Claims 1 and 5 are objected to due to informalities. Claims 1 and 5 are amended to overcome these objections.

Claim 12 is rejected under 35 USC 112, first paragraph, as failing to comply with the enablement requirement. Claim 12 is cancelled.

A method dynamically allocates bandwidth for traffic having a variable data rate in a network. A data rate of the traffic received from the network is measured during fixed length time intervals. A predetermined number of the consecutive measured data rates are grouped into overlapping vectors. A discrete wavelet transform is applied to each overlapping vector to determine frequency bands for each vector and the frequency bands of each vector are analyzed to determine an associated energy of the data rate. Then,

the bandwidth is allocated to the traffic according to the associated energy when the traffic is transmitted.

Claims 1 and 4-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aweya et al. (U.S. Patent No. 6,584,111) in view of Jozawa et al. (U.S. Patent No. 5,311,310).

The invention measures a data rate of traffic received from the network during fixed length time intervals. Aweya measures an effective current bandwidth of traffic, see column 7:

> VBR cells arrive at the switch and enter buffer **152**. Bandwidth measurement module **154** determines the effective bandwidth utilized by current CBR/VBR traffic based on information received about cell arrivals. Flow control mod-

The invention groups a predetermined number of consecutive data rates into **overlapping** vectors, see Figure 6b. The Examiner states that Aweya groups "consecutive data rates" into vectors:

> fixed length time intervals (col. 6, lines 54-67 and col. 13, lines 38-45); grouping a
>
> predetermined number of consecutive data rates into vectors (col. 8, line 53-65; col. 12, lines 20-

The Examiner admits that the vectors in Aweya are **not overlapping** as claimed.

Overlapping vectors are not described at column 6, lines 54-67:

> second type into a second queue. The system includes a first measurement module coupled to the first buffer for measuring an arrival rate of the packets of the first type, a second measurement module coupled to the second buffer for measuring an arrival rate of the packets of the second type, and a flow control module coupled to the first and second measurement modules and the second buffer for determining a congestion state of the switch based on the arrival rates of the first and second type packets and the queue length of the second queue. The first measurement module includes a sampler for sampling the arrivals of the first type packets and a wavelet transform processor coupled to the sampler for determining an effective arrival rate of the first type packets in response to the sampled arrivals

Overlapping vectors are not described at column 12, lines 20-27. Nor are overlapping vectors described at column 13, lines 38-45. Therefore, there is no basis for the Examiner's erroneous assertion that data rates are grouped into overlapping vectors.

The Examiner states that Aweya describes that frequency bands obtained by wavelet transforms are analyzed to determine energy of the data rates:

> discrete time period; applying a discrete wavelet transform to each vector to determine frequency bands for each vector (col. 11, lines 15-45); analyzing the frequency bands of each vector to determine an associated energy of the data rate (col. 13, lines 59-65); and allocating the

In fact, Aweya never mentions the word **energy** anywhere, and certainly not at column 13, lines 59-65:

> I. In general, sampled traffic is separated into signal and noise, i.e., a low-frequency component and a high-frequency component. By subtracting the high-frequency component from the sampled traffic measurements, the method obtains the filtered (low-frequency) component of the original signal. The new effective capacity is the maximum of the filtered signal during the previous measured interval.
>
> A method for calculating effective capacity consistent with the present invention uses the following parameters:

Aweya subtracts the high frequency components obtained by the wavelet transform from the data rate, which yields an **effective capacity**.

In contrast, the invention determines energy according to Equation 7, see page 12:

"Energy of a stochastic process ***X*** at scale *k* can be determined from **W** 600 by $E_k = \sum_{n=2^{k-1}+1}^{2^k} |\underline{W}(n)|^2$, *k:* scale index."

Capacity means the maximum amount or number that can be contained or accommodated (in a network), while energy means the amount of power exerted (by the traffic flow). These are two unrelated limitations. The Applicants respectfully request the Examiner to indicate which word in Aweya could be interpreted to mean **an energy of the data rate** as claimed.

Claimed is allocating the bandwidth to the traffic according to the associated **energy** when the traffic is transmitted.

The Applicants have carefully read the following section:

> everything is counted as high-frequency. The estimate of the effective capacity C_e is then the maximum of the low-frequency component during the window:
>
> $$\max L_n(s),\ nc \leqq s < w+nc \tag{16}$$
>
> which can be used for control purposes. If the wavelet processor uses cell counts directly, the effective capacity (in cells/second) is given by the output of the processor (in cell counts) divided by the sampling interval Δt (in seconds).

However, there is nothing there that would suggest that an energy of bit rates is used to allocate bandwidth to network traffic by Aweya.

In summary therefore, Aweya does not describe the grouping, applying, analyzing and allocating steps as claimed.

Jozawa deals with a video coder that uses motion compensation. The video is in the form of 2D frames. Each frame includes 2D overlapping DCT macroblocks derived from pixels. Processing 2D data in videos during video encoding has nothing to do with 1D overlapping vectors of samples of bit rates obtained from network traffic.

The Examiner does not provide any reasoning for how overlapping 2D blocks of pixels makes obvious overlapping 1D vectors. It would be unnatural to combine the video encoder of Jozawa with the bit rate flow controller of Aweya. These are non-permitted non-analogous art fields under MPEP 904.01(c), and MPEP 2141(a).

Furthermore, the reason for the overlap in Jozawa is to deal with *visual distortion* in video frames *during transformation* from the pixel (spatial) to the DCT (frequency) domains. There is no visual distortion in bit rate measurements as claimed, therefore, the Examiner's reasoning based on "distortion" and "transformation" makes no sense:

> **the input sequence (col. 11, lines 56-62). Jozawa teaches, in a transform system, that overlapping structures helps to prevent distortion during transformation (col. 1, line 65-col. 2, line 6). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to have overlapping vectors in order to help prevent distortion during transformation.**

The claimed bit rate allocation does not consider distortion and transformations.

At Aweya column 13, lines 38-45 describes:

> Sampler **160** generates periodic measurements of the incoming CBR/VBR traffic arriving at buffer **166**. These measurements consist of cell counts divided by Δt, where Δt is the sampling interval. The sampling frequency depends on the link speed and the buffer size. Sampler **160** feeds its output into wavelet transform-based processor **164**. In periodic intervals, processor **164** analyzes the samples and calculates the effective capacity. Buffer manager **162** checks

Applicant cannot find anything related to the claimed clock that sets time intervals $\sum_n \delta(t - nT)$ at a clock rate of $\frac{1}{T}$ for a data counter in Aweya.

As stated above overlapping vectors are not described in the prior art. The Applicants request the Examiner to provide his known prior art that

describes overlapping vectors stored in shift registers, or withdraw the rejection.

The claimed Haar wavelets produce frequency bands from which energy is determined. The prior art does not suggest this function for Haar wavelets.

Niether Aweya nor Jozawa describe overlapping vectors, nor is the Aweya capacity equivalent to the claimed energy.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aweya (U.S. Patent No. 6,584,111) in view of Jozawa et al. (U.S. Patent No. 5,311,310) as applied to claim 1, and further in view of Duffield et al. (U.S. Patent No. 6,452,933).

The Examiner does not provide any reasoning that bandwidth allocated to traffic energy can be used to allocate bandwidth in a fair queuing process. Dunffield only describes fair queuing for a router, not for a bandwidth allocation process as claimed, including an allocation according QoS management.

It is believed that this application is now in condition for allowance. A notice to this effect is respectfully requested. Should further questions arise concerning this application, the Examiner is invited to call Applicant's

attorney at the number listed below. Please charge any shortage in fees due in connection with the filing of this paper to Deposit Account 50-0749.

Respectfully submitted,
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